

Case report

Betel nut chewing associated with severe periodontitis

D Giri¹, P Kundapur², KM Bhat², IK Maharjan³

¹Assistant Professor, Department of Periodontology, College Of Dental Surgery, B.P. Koirala Institute of Health Sciences, Dharan, Nepal, ²Professor, Department of Periodontology, Manipal College Of Dental Sciences, Manipal, Manipal University, Karnataka, India, ³Assistant Professor, Department of Oral Medicine and Radiology, College Of Dental Surgery, B.P.Koirala Institute of Health Sciences

Abstract

Betel quid chewing has been in practice among people in many Asian countries since ages. It is the most widely used psychoactive substance and an important environmental risk factor for development of oral premalignant lesions and cancer. Arecoline, the major alkaloid of areca nut, has been known to cause cytotoxicity and genotoxicity in mammalian cells in vivo and in vitro and even contributes to carcinogenicity. It also increases the risk and severity of periodontal disease. This paper presents a case of betel nut chewing associated with severe periodontitis in a 32 year old male patient.

Keywords: areca, betel nut, periodontitis

Introduction

A number of diseases are associated with food habits, lifestyle and environmental factors. It is estimated that about 600 million people chew betel nut.¹ Very little attention has been paid to the association of smokeless tobacco and betel nut chewing and the health of gingival and periodontal tissues, although a few reports have addressed the chewing of betel or areca nut and its effects on the periodontium.² Recently, in an in vitro study, Jeng and others found that arecoline and areca nut extracts suppressed the growth of cultured gingival keratinocytes.³ These in vitro findings suggest a role of betel nut chewing in the deterioration of gingival and periodontal tissues.

Betel nut chewing is associated with a higher prevalence of bleeding on probing where higher clinical levels of disease existed and with a likelihood of subgingival infection with periodontal pathogens, *Actinobacillus actinomycetemcomitans* and *Porphyromonas*

gingivalis.⁴ In addition, areca quid chewers (current and former) have a significantly higher risk of chronic periodontitis compared with control subjects who never chew areca quid.⁵

This clinical report describes the various intraoral findings that suggest the magnitude of degeneration and destruction of periodontal tissues in a patient having the history of betel nut chewing for more than 10 years.

Case report

A 32-year-old male presented to the Department of Periodontics, Manipal College of Dental Sciences, Manipal with the chief complaint of food lodgement and associated continuous dull type of pain in the gum in lower right and left molar region. He gave the history of habit of betel nut chewing for more than 10 years. Intraoral examination showed moderate deposition of dental calculus and staining of teeth due to betel quid chewing, missing 17(maxillary right second molar) and grade III mobility of teeth 11 and 21 (maxillary right and left central incisors). Periodontal probing revealed pocket depth ranging from 8 to 10 mm in mandibular molar region (fig. 1).

Address for correspondence

Dr. Dharendra K Giri
Department of Periodontology & Oral Implantology
BPKIHS, Dharan
E-mail: drdhiren19@yahoo.co.in



Figure 1: Periodontal pocket

The occlusal surfaces of both maxillary and mandibular molars were heavily attrited suggesting the excessive occlusal forces due to continuous betel nut chewing (fig 2 and 3).



Figure 2 & 3: Attrition of maxillary molars

Gingival recession with furcation involvement of mandibular first molars was evident bilaterally (figure 4).



Figure 4: Gingival recession around the molars

Both molars 36 and 46 (mandibular left and right first molars) showed grade II mobility. The remaining dentition showed pathologic migration of teeth 12, 13, 22 and 23 (upper right and left lateral incisors and canines respectively). Orthopantomogram of the patient's jaws revealed excessive alveolar bone loss around the affected teeth, i.e., 12, 13, 22, 23, 36, 37, 46 and 47 (figure 5).



Figure 5: Tooth 36, 37 and 46, 47 show greater destruction of alveolar bone loss as a result of chewing of the hard betel nut.

It was diagnosed as a case of chronic periodontitis aggravated by betel nut chewing. Extraction was planned for the teeth 11 and 21. Patient was also subjected to planned sessions of scaling and root planing and was instructed to maintain good oral hygiene. Habit stoppage counseling was done and instruction was given to the patient about the adverse effects of chewing betel nut.

Discussion

The present case showed advanced loss of periodontal tissues obviously related to the patients chewing habit of more than 10 years duration. Chewing of betel leaf in combination with hard betel nut, tobacco and calcium would result in trauma from occlusion. It is possible that betel quid chewing damages periodontal tissue as the cholinergic effect of betel quid together with calcium salt in the saliva produced hyper salivation-caused calculus deposition. The increased heavy deposition of calculus then can induce destruction of gingival tissue and periodontal membrane among habitual betel quid chewers.^{4,6} Additionally, the effects

of arecoline (the major alkaloid of areca nut) inhibit cell attachment, cell spreading and cell migration and decrease cell growth and collagen synthesis.^{4,7}

Areca nut extract induces the production of prostaglandin E₂ (PGE₂), the activation of the intracellular calcium concentrations, P-38 mitogen-activated protein kinase, and the extracellular signal-regulated protein kinase inhibitor. These findings suggest that areca nut chewing may induce an inflammatory response and affect the periodontal health of consumers.⁸

The present case report may be supported by a study by Parmar and others⁹ which showed the effect of chewing a mixture of areca nut and tobacco on periodontal tissues and oral hygiene status. The results indicated that a significantly higher number of quid-chewers suffered bleeding from the gums, halitosis, difficulty in opening the mouth and swallowing solid food, a burning sensation in the soft tissues, and ulcers in the oral cavity than non-chewers. The effect of quid chewing on the periodontium, i.e. the occurrence of periodontal pockets, gingival lesions and gum recession, were significantly higher in quid-chewers than in non-chewers.

Sumanth S¹⁰ evaluated and compared the periodontal effects of pan chewing with or without the use of tobacco as an ingredient. The results showed higher incidence of periodontal diseases in pan chewers who used tobacco compared with the pan chewers who did not use tobacco. Thus, it was concluded that although betel nut has deleterious effects on the periodontium, the addition of tobacco leads to a synergistic effect between betel nut and tobacco on the periodontal tissues.

Hence, in view of the above findings it would be appropriate to recommend strict measures to prevent smokeless tobacco use, especially directed towards those in the school going age. This age group is extremely vulnerable to influences from family, peers, advertisements etc. Government and nonprofit agencies should

educate school children and parents about the dangers associated with tobacco products. Tobacco cessation programs should also be offered to help those who currently use tobacco with periodic reinforcement. Efforts should also be directed towards companies producing smokeless tobacco as these companies often target younger people with their marketing campaigns. These programs may attempt to reduce overall health care costs and improve the quality of life. However, by and large, there is very little being done in this direction.

Conclusion

The betel nut or areca nut chewing habits adversely affect the periodontal health of the consumers. The direct damaging influence of arecoline on the periodontal tissues or the deposition of calculus due to hyper salivation and increased calcium salt level both finally lead to

the destruction of periodontal tissues.¹¹ Hence the patients should be made aware of the adverse effects of betel nut chewing or quid chewing which ranges from premalignant and malignant conditions as well as periodontal destruction that leads to premature exfoliation of teeth.

References

1. Nelson BS, Heischouer B. Betel nut: A common drug used by naturalized citizens from India, Far East Asia and the South Pacific Islands. *Ann Emerg Med* 1999;34:238-243.
2. Gupta OP. An epidemiological study of periodontal disease in Trivandrum, India. *J Dent Res* 1964; 43: 867.
3. Jeng JH, Hahn LJ, Lin BR, Hsieh CC, Chan CP, Chang MC. Effects of areca nut, inflorescence piper betel extracts and arecoline on cytotoxicity, total and unscheduled DNA synthesis in cultured gingival keratinocytes. *J Oral Pathol Med* 1999; 28: 64-71.
4. Ling LJ, Hung SL, Tseng SC, Chen YT, Chi LY, Wu KM et al. Association between

- betel quid chewing, periodontal status and periodontal pathogens. *Oral Microbiol Immunol* 2001; 16: 364-369.
5. Teng HC, Lee CH, Hung HC, Tsai CC, Chang YY, Yang YH et al. Lifestyle and psychological factors associated with chronic periodontitis in Taiwanese adults. *J Periodontol* 2003; 74: 1169-1175.
 6. Lee HJ. The history, composition, chemistry and pharmacology of the betel –tobacco chew (QUID). *Dent J Malaysia Singapore* 1973; 13: 63-9.
 7. Jeng JH, Lau WH, Hahn LJ, Hsieh CC and Kuo MY. Inhibition of the migration, attachment, spreading, growth and collagen synthesis of human gingival fibroblasts by arecoline, a major areca alkaloid. *In vitro. J Oral Pathol Med* 1996; 25: 371-5.
 8. Lai YL, Wu CY, Lee YY, Chang HW, Liu TY, Hung SL. Stimulatory effects of areca nut extracts on prostaglandin E₂ production by human polymorphonuclear leukocytes. *J Periodontol* 2010; 81: 758 – 766.
 9. Parmar G, Sangwan P, Vashi P, Kulkarni P, Kumar S. Effect of chewing a mixture of areca nut and tobacco on periodontal tissues and oral hygiene status. *J Oral Sci* 2008 ; 50(1):57-62
 10. Sumanth S, Bhat KM, Bhat GS. Periodontal health status in pan chewers with or without the use of tobacco. *Oral Health Prev Dent* 2008; 6(3): 223-229.
 11. Chatrchaiwiwatana S. Dental caries and periodontitis associated with betel quid chewing: analysis of two data sets *J Med Assoc Thai* 2006; 89 (7): 1004-11.